COORDINATION COMPOUNDS

Assertion and Reason Type

(i) Assertion and reason both are correct and reason is correct explanation
of assertion.
(ii) Assertion and reason both are wrong statements.
(iii) Assertion is correct statement but reason is wrong statement.
(iv) Assertion is wrong statement but reason is correct statement.
(v) Both assertion and reason are correct statements but reason is not correct explanation of assertion.

1. **Assertion** : Toxic metal ions are removed by the chelating ligands.
Reason : Chelate complexes tend to be more stable.
2**. Assertion** : $[Cr(H_2O)_6]Cl_2$ and $[Fe(H_2O)_6]Cl_2$ are reducing in nature.
Reason : Unpaired electrons are present in their *d*-orbitals.
3. **Assertion :** $[Fe(CN)_6]^{3-}$ ion shows magnetic moment corresponding to two unpaired electrons.
Reason : Because it has d^2sp^3 type hybridisation.

4. **Assertion:** $K_4[Fe(CN)_6]$ will not produce Fe^{+2} and CN^- in aqueous solution.

Reason: $FeSO_4.(NH_4)_2SO_4.6H_2O$ is double salt, gives Fe^{+2}, NH_4^+, SO_4^{2-} ions in aq. Sol.

5. **Assertion:** When a coordination compound $CrCl_3.6H2O$ is mixed with excess of $AgNO_3$, 2 moles of AgCl are precipitated.

Reason: $[Co(H_2O)_5Cl]Cl_2.H_2O$ is structural formula of complex, 2 moles of Cl^- are counter ions, ionisable which get precipitated by $AgNO_3$.

Multiple Choice Questions

1. IUPAC name of $[Pt(NH_3)_2Cl(NO_2)]$ is :
(i) Platinum diaminechloronitrite
(ii) Chloronitrito-N-ammineplatinum (II)
(iii) Diamminechloridonitrito-N-platinum (II)
(iv) Diamminechloronitrito-N-platinate (II)

2. Which of the following species is not expected to be a ligand?
(i) NO
(ii) NH_4^+
(iii) $NH_2CH_2CH_2NH_2$
(iv) CO

3. A chelating agent has two or more than two donor atoms to bind to a single metal ion. Which of the following is not a chelating agent?
(i) thiosulphato
(ii) oxalato

(iii) glycinato
(iv) ethane-1,2-diamine

4. The CFSE for octahedral $[CoCl_6]^{4-}$ is 18,000 cm^{-1}. The CFSE for tetrahedral $[CoCl_4]^{2-}$ will be
(i) 18,000 cm^{-1}
(ii) 16,000 cm^{-1}
(iii) 8,000 cm^{-1}
(iv) 20,000 cm^{-1}

5. The stabilisation of coordination compounds due to chelation is called the chelate effect. Which of the following is the most stable complex species?
(i) $[Fe(CO)_5]$
(ii) $[Fe(CN)_6]^{3-}$
(iii) $[Fe(C_2O_4)_3]^{3-}$
(iv) $[Fe(H_2O)_6]^{3+}$

6. When 1 mol $CrCl_3$.6H2O is treated with excess of $AgNO_3$, 3 mol of AgCl are obtained. The formula of the complex is :
(i) $[CrCl_3 (H_2O)_3].3H_2O$
(ii) $[CrCl_2(H_2O)_4]Cl.2H_2O$
(iii) $[CrCl(H_2O)_5]Cl_2.H_2O$
(iv) $[Cr(H_2O)_6]Cl_3$

7. When 0.1 mol $CoCl_3(NH_3)5$ is treated with excess of $AgNO_3$, 0.2 mol of AgCl are obtained. The conductivity of solution will correspond to
(i) 1:3 electrolyte
(ii) 1:2 electrolyte
(iii) 1:1 electrolyte
(iv) 3:1 electrolyte

8. Which of the following has square planar structure?
(i) $[NiCl_4]^{2-}$
(ii) $[Ni(CO)_4]$
(iii) $[Ni(CN)_4]^{2-}$
(iv) None of these
9. The solution of the complex $[Cu(NH_3)_4]$ SO_4 in water will
(i) give the tests of Cu^{2+} ion
(ii) give the tests of NH_3
(iii) give the tests of SO_4^{2-} ions
(iv) not give the tests of any of the above

10. IUPAC name of $[Pt(NH_3)_3$ Br (NO_2) Cl] Cl is
(i) triamminechlorodibromidoplatinum (IV) chloride
(ii) triamminechloridobromidonitrochloride- platinum (IV) chloride
(iii) triamminebromidochloridonitroplatinum (IV) chloride
(iv) triamminenitrochlorobromoplatinum (IV) chloride